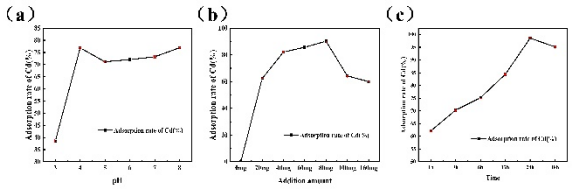
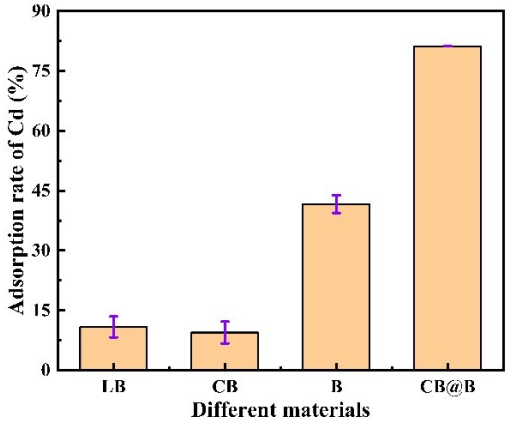


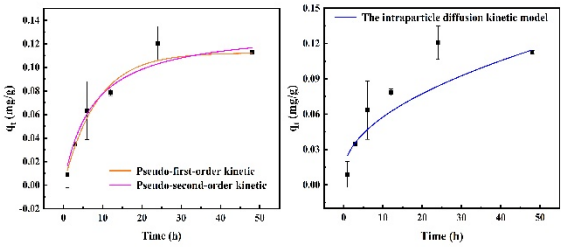
Supporting information

Fig. S1 Influences of pH, addition amount and reaction time during Cd adsorption of 400℃ CB@B (400℃ biochar with



Bacillus subtilis)

Fig. S2 Adsorption rate of Cd in water by different materials (B means *Bacillus subtilis*, LB means LB medium, CB@B



means 400℃ corncob biochar with *Bacillus subtilis*, CB means 400℃ corncob biochar)

Fig. S3 The sorption kinetic models fitting parameters for Cd^{2+} adsorption by 400℃ corncob biochar loaded *Bacillus subtilis* (400 ℃ CB@B)

Table S1

The heavy metals content of the 400 ℃ corncob biochar. (unit: mg kg^{-1})

Corncob biochar	Cd	Cr	Cu	Pb	As
XRF	<0.3	60.3	6.24	<1.3	<0.4
Measureed value	0.29	—	—	—	—

Table S2

The contents of heavy metals and physicochemical properties in tested soil. (mg kg^{-1})

Tested Soil	Cd	Cr	Pb	As	pH	Available nitrogen	Available phosphorus
XRF	1.3±0.3	128.6±19.9	48.2±1.2	10.8±0.5	—	—	—
Measured value	1.4±0.2	—	—	—	7.2±0.2	25.69	4.00

Table S3

The intraparticle diffusion, the pseudo-first-order and pseudo-second-order models fitting parameters for Cd^{2+} adsorption by 400 ℃ CB@B (400℃ biochar with *B. subtilis*).

Model	Parameter 1	Parameter 2	Parameter 3
Pseudo-first-order	q_e=0.12	K_1=0.11	R^2=0.995
Pseudo second-order	q_e=0.13	K_2=1.01	R^2=0.986
Intraparticle diffusion	C_1=0.01	K_i=0.01	R^2=0.969

The digestion experiment was performed according to the Chinese standard HJ 832-2017 (Soil and sediment – Digestion of total metal elements – Microwave assisted acid digestion method). Specifically, 0.25 g of the ground sample was placed in a crucible, and 2 mL $HClO_4$, 3 mL HNO_3, and 8 mL HF were added. The crucible was heated to 120 °C until the brown color disappeared. After the mixture was dried, the above acids were added, and the mixture was heated again. The mixture was dried again, and the crucible was cleaned with $HClO_4$ until the residual was completely digested and dried. Then, 2 mL HNO_3 with a water/HNO_3 ratio of 1:1 and 5‰HNO_3 were added to the crucible until the sample was completely digested, which was indicated by the solution becoming transparent. Cd was measured using inductively coupled plasma optical emission spectroscopy (ICP-OES, Optima, 2000; PerkinElmer Co., USA).

Tessier's method contains five steps, as listed below.

(1) Exchangeable Cd is extracted by $MgCl_2$ (1 mol L^{-1}).
(2) Carbonate-bound Cd is extracted by CH_3COONa (1 mol L^{-1}).
(3) Fe–Mn oxide-bound Cd is extracted by $NH_2OH{\cdot}HCl$ (0.04 mol L^{-1}).
(4) Organic Cd is extracted by HNO_3 (0.02 mol·L^{-1}) and 6 mL 30% H_2O_2.
(5) Residual Cd is calculated by subtracting the sum of the first four steps from the difference of the total amount extracted.